



Observations and Suggestions for Improved Transport/Packaging Approvals

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1. Background

This paper has been developed from my personal experience as Manager, Facility Licensing with Global Nuclear Fuels in Wilmington, NC over the past four years. All of my examples involve the movement of Type A, fissile material, however, the observations and recommendations clearly have universal application to the movement of other nuclear materials. The observations are global in nature embracing the US, Canada, Japan, the European Union as well others. All of these countries openly report and ascribe to the fact that they have adopted the IAEA Regulations for the Safe Transport of Radioactive Material. The materials involved typically include UF₆, UO₂ powder, BWR fuel assemblies and process intermediates. Many of the papers here discuss the technical details of testing and the interpretation of the test results associated with the approval of transport packages. The technical details of demonstrating safety are of course very important in the overall assurance of safety. My discussion involves, for the most part, Section VIII – Approval and Administrative Requirements of TS-R-1. I have focused on this area because significant non-productive time is spent on these administrative matters and to a degree this non-productive time spent potentially detracts from meeting the objective of safe transport of nuclear materials.

2. Recommended Improvement in TS-R-1 Objective Statements

Before addressing my observations and recommendations that focus on Section VIII, I would like to address one fundamental component that appears to be missing from the objectives stated in TS-R-1, Section I. Section I already speaks to the objectives of the safe transport of radioactive materials, however, it has become obvious to me that a key cornerstone of that objective has not been published nor is it always strongly adhered to by, shippers, transporters and *Competent Authorities* around the world. The key cornerstone that needs to be added, and strongly adhered to, can best be stated as follows: "Shipments should not be initiated until all provisions and permissions that are required are in place to allow the shipment to move efficiently and without administrative delay to the final destination". In this context no shipment would ever be orphaned or held-up for any reason other than a safety related emergency. My recommendation would be to add the previously quoted wording to Section I, Paragraph 104. Included in the wording should be the directive that it is the collective responsibility of all shippers, transporters and *Competent Authorities* to see that this objective is met.

This recommendation is necessary because current experience indicates that this fundamental philosophy, so important to safe transport, is not universally practiced. Quite a number of countries *Competent Authorities* have adopted a practice of not issuing approvals until sometime after the shipments are scheduled to depart the shipping origination point. In general the authority claims a high work load is responsible for this but from a practical view it appears if one can consistently issue approvals late it would also be possible to issue them on time. In some other cases, the *Competent Authority* will not make the permit information available to the shipper, claiming proprietary information reasons. This obviously takes away the shipper's and the transporter's ability to make this assurance and sets up a condition where these shipments could be orphaned during transport.

In other cases, the *Competent Authority* is not the only agency in a country that has to give approval to the movement of material. For example the *Competent Authority* may in fact provide the approval of the shipping package; however, there may be a separate and independent authority that gives transport approval and even an additional agency that governs some other aspect of the transport such as the sea port operations. Clearly, it is the right of each and every country to establish decision making processes that are appropriate for ensuring the safe movement of nuclear materials in and around their country. However, as the IAEA framework establishes, the *Competent Authority* should be empowered with the ability to coordinate such activity in a given country and facilitate the safe movement of material such that administrative delays in transit are avoided.

3. Observations and Recommendations for Design Approval

The administrative program outlined by TS-R-1 appears to be relatively straightforward and easy to follow. In addition it appears to be logical and flexible enough to handle most situations. The problems that I have observed are where one or more party (shipper, transporter, *Competent Authority*) using the standard do not follow the guidance and/or try and bend it to cover a special situation which might otherwise be handled in a different manner under TS-R-1.

TS-R-1 Section VIII, Paragraphs 802 through 817 cover in detail the program for *Design Approval* of packages. It would seem most logical in the context of TS-R-1, that *Design Approval* would be reserved for the approval given by the *Competent Authority* that undertakes the original examination and evaluation of the design and test information for the package to verify that the technical requirements of TS-R-1 are met. This does not always appear to be the case. In most cases where deviations have been observed, TS-R-1 would have an alternate way of accomplishing what the *Competent Authority* appeared to be trying to accomplish. Therefore the deviation would not be necessary.

There are quite a number of cases where multiple *Design Approvals* appear to be issued for the same package design. It is possible that some of the *Design Approvals* might contain a few slight deviations from the original design such as slightly different dimensions. However, the basic design is exactly the same and in evaluating the design basis information and the testing information there is no difference from one package to the next. This creates significant confusion to the transportation community because the same package may have different identifications. One of the largest reasons this has existed is the fact that some countries use the *Design Approval* to denote the owner of a particular group of packages that have been fabricated. The more appropriate manner to accomplish the division of ownership of packages manufactured to a single design, but fabricated and/or owned by different owners, is via the serial number requirements and registration requirements outlined in TS-R-1, paragraphs 819 and 311. Therefore the *Competent Authorities* should work together to eliminate this duplication of package *Design Approval* and adopt the serialization and registration specified in TS-R-1 as a means to track ownership.

In other cases, multiple *Design Approvals* are issued for essentially the same package because different owners want to make minor variations to the original design. In these cases, the party different from the original design holder, copies over the original design data with some modifications and some engineering evaluations to show it meets the requirements. They also include the original test data of which they have no first hand knowledge of the underlying detail nor the source data associated with the testing. They then submit a package *Design Approval* application but the pedigree for the package begins to lose its validity at this point. In this case, a new design is adopted that is not substantially different from the original, based on test data and evaluations for which the applicant is not in a position to establish validity and the approval is based on the *Competent Authorities* knowledge of a prior approval. This places a discontinuity in the pedigree of the "new design". In these cases the *Competent Authority* should work to consolidate designs by expanding specifications for the original design and requiring that only the originator of the test data be able to use it to substantiate the validity of a design to the technical requirements.

In other cases, *Competent Authorities* make it appear there are multiple *Design Approvals* when there really are not because those countries do not follow the *revalidation* process. In most of these cases, the *Competent Authority* issues a *Design Approval* certificate that does not mention the *Design Approval* for the package and it makes it appear that the *Competent Authority* made an original determination when in fact they did not, and they are not the expert on the package. This confuses the system when trying to find out who is the actual authority on a specific package and could become critical in the event of an emergency of similar situation where quick answers are needed. The recommendation here is that every certificate issued for a package design, other than the original *Design Approval* certificate and special arrangements must clearly call out, by explicit reference, the design certificate that is used as the basis for that *Competent Authority's* approval. This does not require the use of the word *validation* or *revalidation*, which appears to be objectionable to some cultures, but must make clear that it is only an approval of a particular design including reference to that design by model number and VIR code as described in paragraph 828 of TS-R-1. In addition, a new term needs to be developed for these approval cases. A suggestion would be to denote these approvals as **Design Verification** certificates. In this case **Design Verification** would signify that the *Competent Authority* has reviewed and verified the design of the package.

Another confusing behavior by some *Competent Authorities* is the changing of the original design package *type* assignment particularly when this is in a non-conservative direction. For example: *Type A* becomes a *Type B*. This should be avoided by all *Competent Authorities* as it causes significant confusion and could lead to improper conclusions regarding packages.

4. Observations and Recommendations for Approval under *Special Arrangements*

Package approvals under *Special Arrangements* are another area where the practice is not universally consistent. TS-R-1, paragraphs 824 – 826, 831 and 834 cover the approval under special arrangements. In the context of TS-R-1, approval under *Special Arrangements* should only be used where the package design, as demonstrated in the *Design Approval* fails to meet one or more of the technical design requirements of TS-R-1.

In the majority of cases, it appears that *Special Arrangement* approvals are being issued in cases where *Competent Authorities* want to impose certain restrictions on the use of the package in their country. The reasons for this are many including some where a particular *Competent Authority* does not agree with other *Competent Authorities* that a package meets the technical requirements. Or in some cases, a *Competent Authority* may believe that within their country special precautions are necessary for safe transport. In any case the exact reason is not important. What is important is that *Competent Authorities* have the right to impose any special requirements for transport within their country that they deem necessary for safe transport. The IAEA provides for this. The recommendation here is that these special controls/requirements be placed in the country specific approvals/revalidations made in accordance with TS-R-1 and not placed in a *Special Arrangements* approval certificate.

The reason for the above recommendation is that the current practice is responsible for many deviations from TS-R-1, however, if TS-R-1 was complied with in each case significant confusion would abound. To understand this, assume for an instant that a country believed that for transport in their country a speed limit of 30 km/h was necessary because the physical testing of a particular package did not demonstrate the margin of safety they believed necessary. In this case the *Competent Authority* issues a *Special Arrangements* approval certificate for the package and it requires a speed limit of 30 km/h. To properly comply with the multi-lateral approval requirements of TS-R-1 regarding *Special Arrangements*, all previously approving *Competent Authorities* would have to re-approve the *Special Arrangements* to be in conformance with TS-R-1. Conversely, if the *Competent Authority* simply issued a validation under paragraph 834 and included the stipulation in that approval that a 30 km/h speed limit was to be observed the task would be handled much more efficiently, TS-R-1 would be complied with and the country would have safe transport of the package.

5. Conclusions and Summary

Clearly, the safe and efficient movement of nuclear materials requires extensive cooperation between everyone involved. Therefore, good working relationships need to be adopted between all parties. The smoother the process works the easier it is on everyone. The best foundation for these relationships is a clear and consistent set of working rules. IAEA TS-R-1 appears to set the framework. In this context, I offer the following recommendations.

Shippers

- (1) Understand the regulations set forth in TS-R-1 and adopt a policy of operating with integrity while following the rules
- (2) Setup a management system with checks and balances to ensure compliance
- (3) Avoid the tendency to take shortcuts – Insist that those supporting your operations also follow the rules and protocol
- (4) Respectfully insist that *Competent Authorities* follow the IAEA practices and
- (5) Identify problems and actively work to promote solutions

Transporters

- (1) Apply the same recommendations as identified for the shipper
- (2) Respectfully insist that your customers and interfaces comply with the IAEA practices and work with them as necessary to achieve this objective

IAEA

- (1) Add the objective statement to paragraph 104 of TS-R-1 and continually reinforce this with the *Competent Authority* community
- (2) Establish guidance for a **Design Verification** certificate to be used in lieu of the current *revalidation* terminology that some find objectionable. Modify paragraph 833 to clearly specify the act of *Design Approval* as discussed in this paper. Modify paragraph 834 to incorporate **Design Verification** as the approach to what is currently called *revalidation* and
- (3) Modify the guidance document TS-G-1.1 with details that clearly explain the need objectives and benefit from the above approaches

Competent Authorities

- (1) Work to incorporate strict conformance to TS-R-1, Section VIII processes in each respective member country
- (2) Stop multiplying *Design Approvals* for similar design packages
- (3) Require applicants for *Design Approvals* to produce test data generated by the applicant demonstrating that the package meets the regulatory requirements
- (4) Reserve the use of *Special Arrangements* to only those cases where the *Design Approval* denotes that the package fails to meet the basic design criteria of TS-R-1
- (5) Do not use *Special Arrangements* to specify country specific transport measures or within country design compensatory measures. Include these in the package approvals or transport permits
- (6) Spearhead activities in each respective country to align the activities of each state agency to support a unified approach toward dealing with nuclear transport matters and
- (7) Cooperate and encourage all other *Competent Authorities* to do the same

The fact that the *Competent Authorities* in number have more recommendations is not indicative that they shoulder more of the problem but rather is representative of the fact that there are a lot of *Competent Authorities* involved in the movement of material and a number of them have some deviation with the way TS-R-1 is handled. Again, the important message is that all parties to the transport of nuclear material must work together effectively and efficiently. Administrative matters need to be simple and easily understood so that they are effective and reduce the burden on everyone.